Pressure – 2021 IGCSE 0625

1. June/2021/Paper_11,12,13,21,22&23/No.12

A book has a mass of 400 g.

The surface of the book in contact with a table has dimensions 0.10 m × 0.20 m.

The gravitational field strength *g* is 10 N / kg.

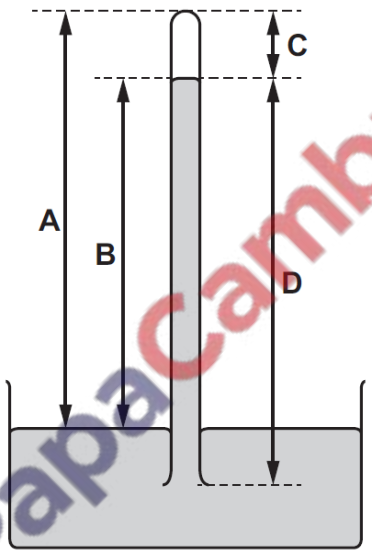
What is the pressure exerted on the table due to the book?

A $0.08\,N/m^2$ **B** $8.0\,N/m^2$ **C** $20\,N/m^2$ **D** $200\,N/m^2$

2. June/2021/Paper_11/No.13

A mercury barometer is used to measure atmospheric pressure.

Which distance gives a measure of the atmospheric pressure?



3. June/2021/Paper_11/No.14

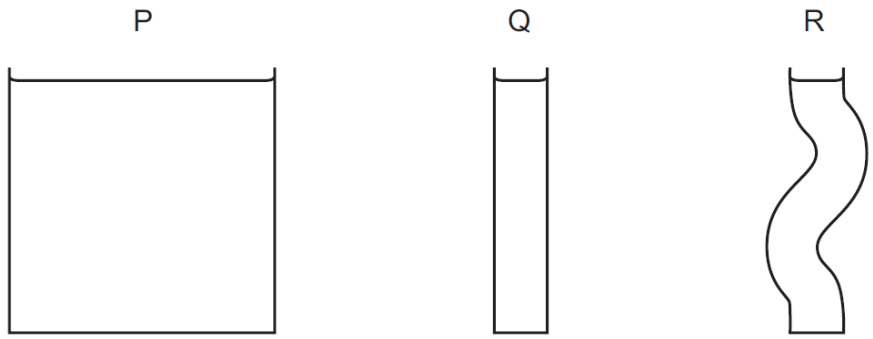
Air trapped in a sealed bottle increases in temperature.

Which row shows the changes that occur to the trapped air?

	pressure of the air	average speed of molecules in the air
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

4. June/2021/Paper_12/No.13

The diagrams show three containers, P, Q and R.



Each container contains the same liquid.

The depth of the liquid is the same in each container.

Which statement about the pressure of the liquid at the bottom of the container is correct?

A The pressure of the liquid at the base of P is greatest.

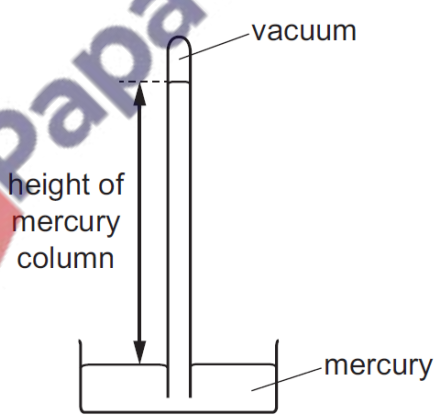
B The pressure of the liquid at the base of Q is greatest.

C The pressure of the liquid at the base of R is greatest.

D The pressures of the liquid at the bases of P, Q and R are the same.

5. June/2021/Paper_13/No.13

The diagram shows a piece of equipment which is used to measure atmospheric pressure.



What is this piece of equipment?

A barometer

B galvanometer

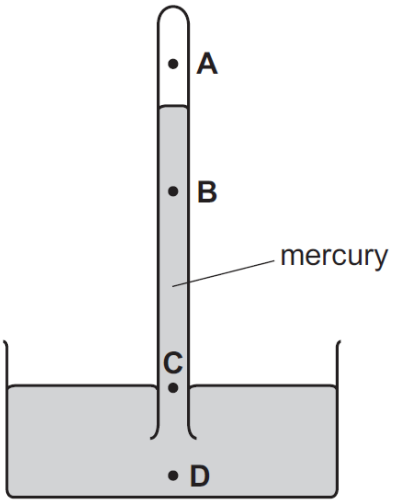
C newton meter

D thermometer

6. June/2021/Paper_21/No.13

The diagram shows a mercury barometer.

At which point is the pressure greater than atmospheric pressure?



7. June/2021/Paper_22/No.13

A horizontal metal plate of area 0.50 m^2 lies at the bottom of a lake at a depth of 40 m.

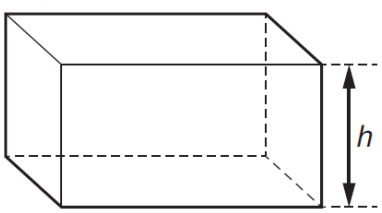
The density of water is 1000 kg / m^3 and the gravitational field strength g is 10 N / kg.

What is the downward force acting on the plate due to the water?

A 20 kN **B** 80 kN **C** 200 kN **D** 800 kN

8. June/2021/Paper_23/No.13

The diagram shows a tank full of water.



The mass of water in the tank is m.

The density of the water is ρ.

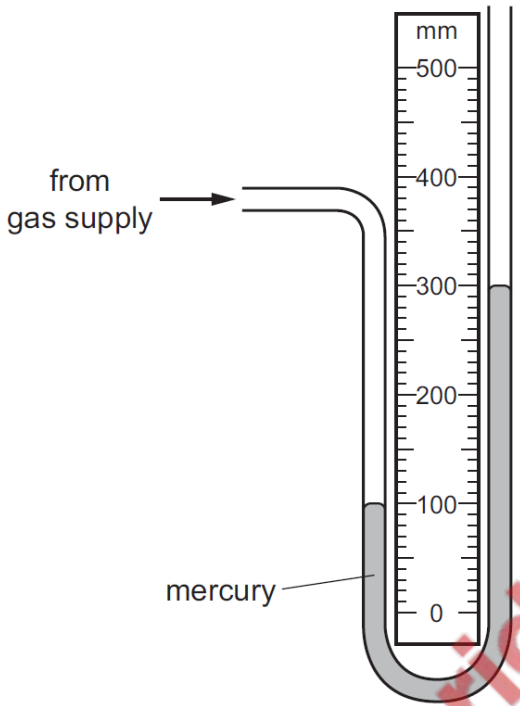
The height of water in the tank is h.

Which equation gives the pressure p due to the water at the bottom of the tank?

A $p = h\rho g$ **B** $p = mgh$ **C** $p = m\rho g$ **D** $p = m\rho h$

9. March/2021/Paper_12&22/No.12

The diagram shows a manometer connected to a gas supply.



What is the pressure of the gas supply?

A 100 mm Hg above atmospheric pressure

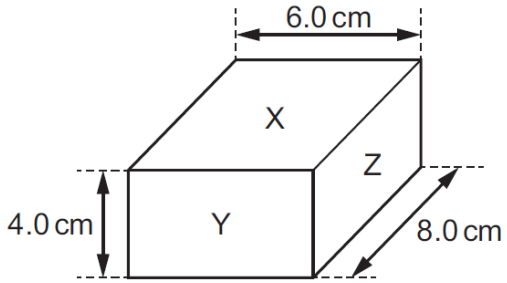
B 100 mm Hg below atmospheric pressure

C 200 mm Hg above atmospheric pressure

D 200 mm Hg below atmospheric pressure

10. March/2021/Paper_12&22/No.13

The diagram shows a box of dimensions 6.0 cm × 8.0 cm × 4.0 cm.



The box rests on a flat horizontal surface.

On which face must the box rest in order to exert the least pressure?

A face X

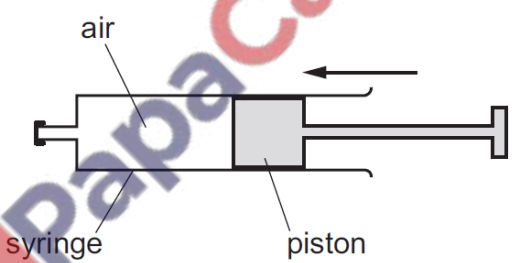
B face Y

C face Z

D The pressure is the same for all the faces.

11. March/2021/Paper_12&22/No.14

Air in a sealed syringe is slowly compressed by moving the piston. The temperature of the air stays the same.



Which statement about the air is correct?

A The pressure of the air decreases because its molecules now travel more slowly.

B The pressure of the air decreases because the area of the syringe walls is now smaller.

C The pressure of the air increases because its molecules now hit the syringe walls more frequently.

D The pressure of the air increases because its molecules now travel more quickly.

12. June/2021/Paper_32/No.5

Fig. 5.1 shows a device connected to a gas cylinder. The device is used to measure the pressure of the gas inside the cylinder.

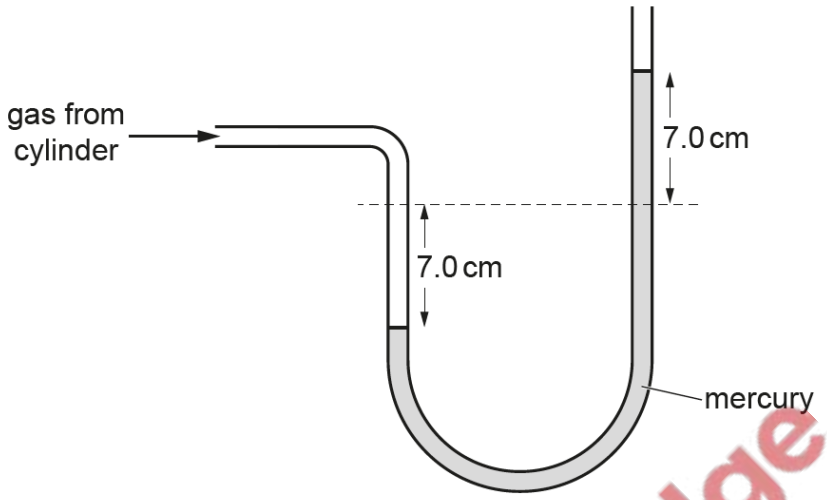


Fig. 5.1

(a) (i) State the name of the device shown in Fig. 5.1.

..... [1]

(ii) The atmospheric pressure is equal to 75 cm of mercury.

Determine the pressure of the gas in the cylinder. Use information from Fig. 5.1.

pressure of gas = ... cm of mercury [2]

(b) Fig. 5.2 shows two identical heavy stone tiles placed on soft ground. One is vertical and the other is horizontal.

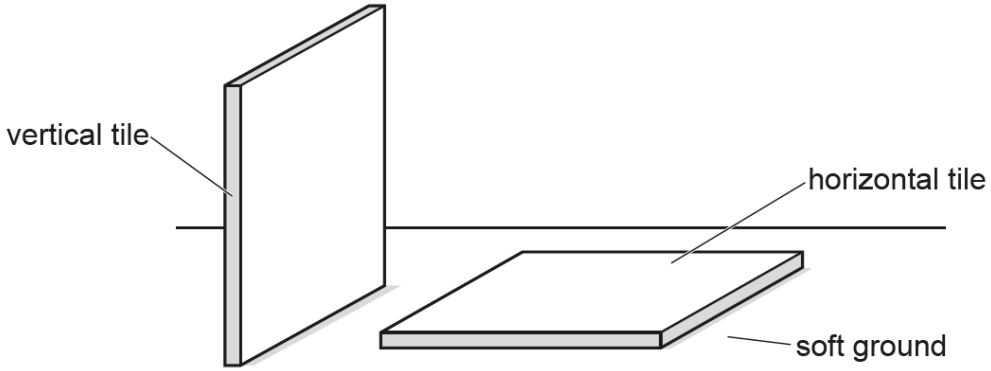


Fig. 5.2

One of the tiles sinks into the soft ground.

State and explain which tile sinks into the soft ground.

.....

.....

.....

.....

.....

..... [4]

[Total: 7]

13. June/2021/Paper_33/No.5

(a) Fig. 5.1 shows a tractor and a car of the same weight.

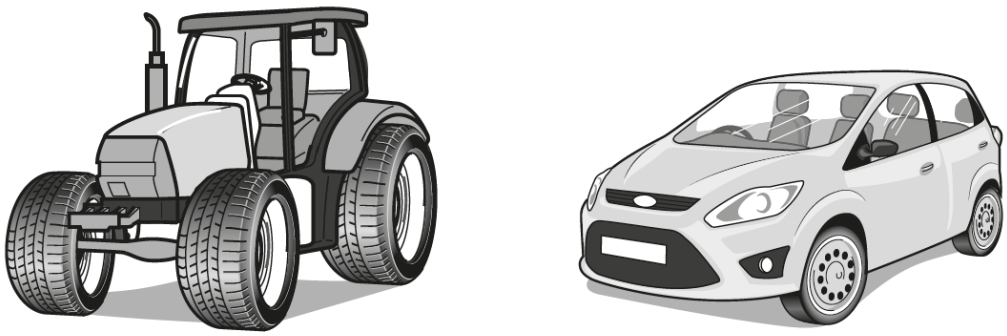


Fig. 5.1

The vehicles drive over the same soft ground.

Explain why the car sinks into the soft ground but the tractor does **not** sink.

.....

.....

.....

..... [3]

(b) The car driver measures the pressure of the air in a car tyre when the air is cool.

The Sun heats the air in the tyre. The driver measures the pressure of the air in the tyre when the air is warm.

The pressure of the air in the warm tyre is greater.

Explain the increase in the pressure of the air in the tyre. Use ideas about air molecules.

.....

.....

.....

..... [3]

[Total: 6]

14. June/2021/Paper_41/No.3

(a) Explain, in terms of molecules, why liquids are very difficult to compress.

.....

.....

..... [2]

(b) Fig. 3.1 shows a device that uses liquid pressure to lift heavy boxes.

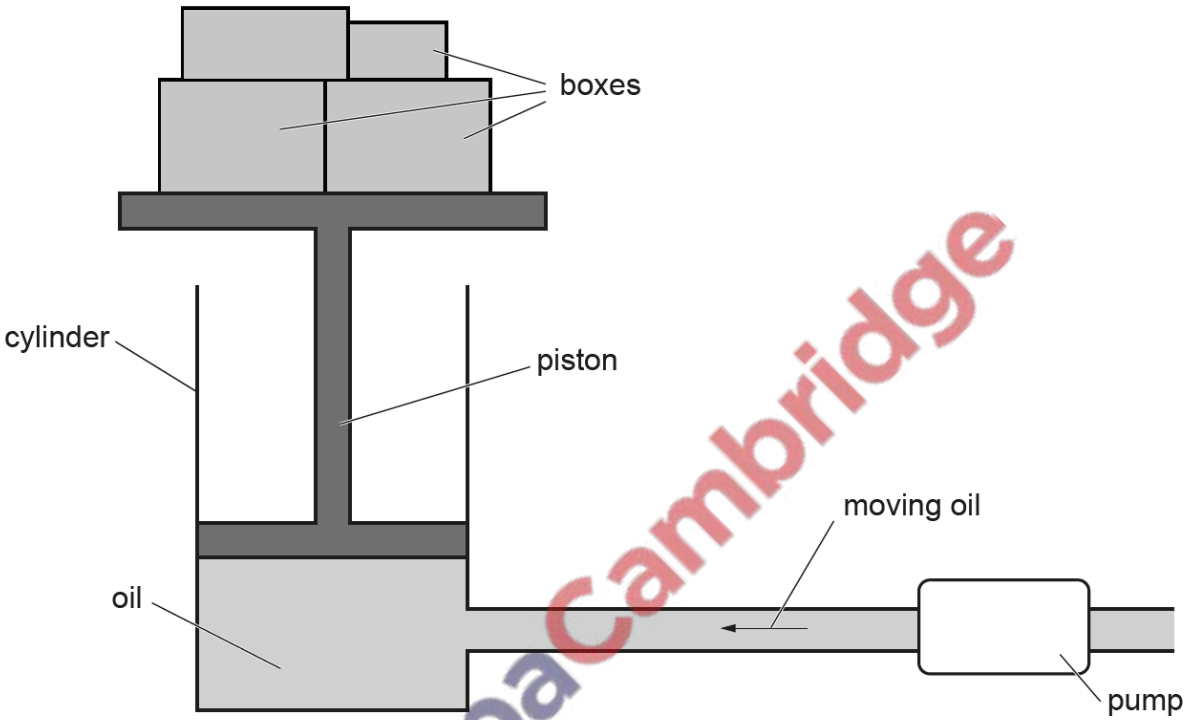


Fig. 3.1

The boxes are lifted by pumping oil into the cylinder.

The force upwards on the piston due to the oil, and the force downwards on the piston due to the air above the piston, combine to produce a constant force of 8800 N.

The pressure of the air is 1.0×10^5 Pa and the cross-sectional area of the bottom surface of the piston is $0.016\,m^2$.

(i) Calculate the pressure of the oil at the bottom surface of the piston.

pressure = ... [3]

(ii) As the boxes are lifted, the depth of the oil increases.

Explain why the pump must exert an increasing pressure on the oil as the depth of the oil increases.

.....

.....

..... [2]

(iii) Suggest **one** reason why the force of 8800 N in **(b)** cannot lift boxes of weight 8800 N.

.....

..... [1]

[Total: 8]

15. June/2021/Paper_43/No.2

(a) Fig. 2.1 shows a bookshelf with two groups of books A and B on it. There are six books in each group of books. All the books are identical. The mass of each book is 0.52 kg.

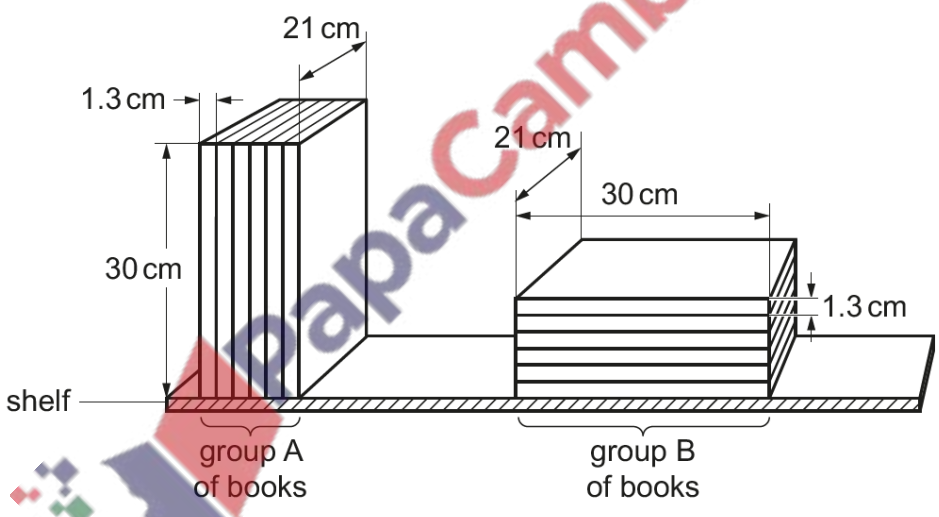


Fig. 2.1

(i) Explain why the pressure exerted on the shelf by the books in group B is less than the pressure exerted on the shelf by the books in group A.

.....

.....

..... [3]

(ii) Calculate the pressure exerted on the shelf by the books in group A.

pressure = ... [3]

(b) A diver dives to a depth below the surface of the sea where the total pressure is 3.0×10^5 Pa. The atmospheric pressure is 1.0×10^5 Pa. The density of the sea water is 1030 kg / m^3.

Calculate the depth of the diver below the surface of the sea.

depth = ... [3]

[Total: 9]

16. March/2021/Paper_32/No.5

Fig. 5.1 shows a metal block on a flat surface.

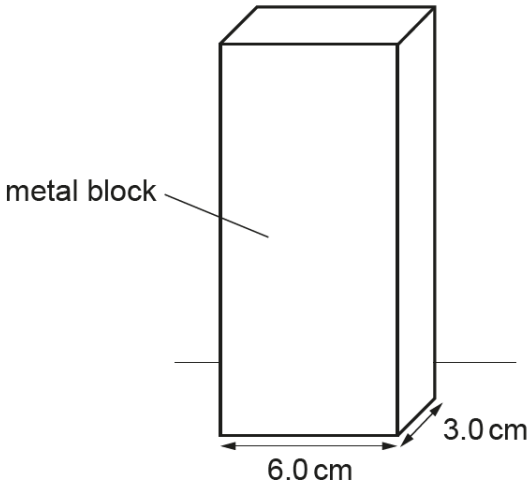


Fig. 5.1

(a) (i) The mass of the metal block is 1.6 kg.

Calculate the weight of the metal block.

weight = ... N [2]

(ii) Calculate the pressure on the flat surface due to the metal block.

pressure = ... N/cm^2 [3]

(b) In an experiment, the metal block is heated and the temperature of the metal block increases by 100 °C.

State the effect, if any, of the temperature increase on:

1. the volume of the metal block .....
2. the mass of the metal block .....
3. the density of the metal block .....

[3]

[Total: 8]

17. March/2021/Paper_42/No.4

(a) In terms of the momentum of molecules, explain how a gas exerts pressure on the walls of its container.

.....

.....

.....

.....

.....

.....

..... [4]

(b) A fixed mass of gas of volume V_1 is at a pressure p_1. It is compressed to a volume V_2.

(i) Complete the equation for the final pressure p_2 of the gas when the gas is compressed at constant temperature.

p_2 =

[2]

(ii) State and explain how the final pressure compares with p_2 when the temperature of the gas increases during compression.

statement .....

explanation .....

.....

.....

.....

[3]

[Total: 9]